

Percentages of indications verified, January, 1889.

States.		States.	
Maine.....	84.4	Tennessee.....	80.6
New Hampshire.....	87.0	Kentucky.....	81.9
Vermont.....	83.8	Ohio.....	81.7
Massachusetts.....	83.4	West Virginia.....	85.6
Rhode Island.....	84.9	Indiana.....	83.2
Connecticut.....	85.6	Illinois.....	85.5
Eastern New York.....	84.3	Lower Michigan.....	81.9
Western New York.....	80.3	Upper Michigan.....	83.4
Eastern Pennsylvania.....	90.3	Wisconsin.....	81.5
Western Pennsylvania.....	84.3	Minnesota.....	82.7
New Jersey.....	88.2	Iowa.....	81.9
Delaware.....	88.6	Kansas.....	87.2
Maryland.....	90.2	Nebraska.....	83.5
District of Columbia.....	90.6	Missouri.....	88.1
Virginia.....	91.4	Colorado.....	82.1
North Carolina.....	87.8	Dakota.....	78.5
South Carolina.....	86.0	Southern California.....	95.2
Georgia.....	83.7	Northern California.....	83.9
Eastern Florida.....	84.8	Oregon.....	83.6
Western Florida.....	83.5	Washington Territory.....	81.1
Alabama.....	84.1	By elements: Weather.....	87.0
Mississippi.....	81.8	Temperature.....	81.6
Louisiana.....	86.5	Monthly percentage of weather and temperature combined.....	84.8
Texas.....	84.9		
Arkansas.....	88.3		

* In determining the monthly percentage of weather and temperature combined, the Pacific coast states are not included. † The monthly percentage of weather and temperature combined is determined by multiplying the percentage of weather by 6, and the percentage of temperature by 4, and dividing their sum by 10.

CAUTIONARY SIGNALS FOR JANUARY, 1889.

Statement showing percentages of justifications of wind signals and cold-wave signals for the month of January, 1889: Wind signals.—(Ordered by Captain Robert Craig.) Total

number of signals ordered, ninety-five; justified as to velocity, wholly, sixty-six, partly, five; justified as to direction, eighty-nine. Of the signals ordered, forty were cautionary, of which twenty-one were wholly, and three partly justified; fifty-five were storm, of which forty-five were wholly, and two partly justified. Thirty-nine were ordered for easterly winds, of which thirty-six were justified, and fifty-six were ordered for westerly winds, of which fifty-three were justified. Ten signals were ordered late. Number of winds without signals, eighteen. Percentage of justifications, 71.6.

Cold-wave signals.—(Ordered by Assistant Prof. T. Russell.) Total number of signals ordered, three hundred and ninety-three; number wholly justified, two hundred and fifteen, of which eight were ordered late. Number partly justified, thirteen. Number of severe cold waves without signals, twenty-four. Percentage of justifications, 55.0.

Percentages of local verifications of weather and temperature signals as reported by directors of the various State Weather Services for January, 1889.

States.	Weather.	Temperature.	States.	Weather.	Temperature.
Illinois.....	86.0	81.0	Nebraska.....	91.0	85.0
Indiana.....	87.3	83.3	New Jersey.....	88.0	84.6
Kansas.....	91.3	82.5	New York.....	85.0	79.0
Kentucky.....	84.0	83.0	North Carolina.....	85.0	79.0
Louisiana (northern).....	88.0	92.0	Ohio.....	90.0	86.0
Louisiana (southern).....	80.0	80.0	South Carolina.....	72.2	81.0
Michigan.....	83.1	81.5	Tennessee.....	83.6	77.1
Minnesota and eastern Dakota.....	83.0	77.0	Texas.....	88.0	87.0

STATE WEATHER SERVICES.

[Temperature in degrees Fahrenheit; precipitation, including melted snow, in inches and hundredths.]

The following extracts are republished from reports for January, 1889, of the directors of the various state weather services:

ALABAMA.

The month was uniformly cooler than the average January, but there were few decidedly cold days. The temperature was 3.1 below the normal.

At most stations the precipitation was in excess of the normal. This was particularly true in a belt passing through middle Alabama. Rain fell frequently during the month. There was a slight fall of snow on the 28th, but, soon melting, its effects were inappreciable. The average precipitation was 0.55 above the normal.

Summary.

Temperature.—Monthly mean, 44.1; highest monthly mean, 50.4, at Tuscaloosa; lowest monthly mean, 40, at Florence; maximum, 81, at Troy, 17th; minimum, 17, at Motes, 29th; range for state, 64; greatest local monthly range, 69, at Troy; least local monthly range, 37, at New Market.

Precipitation.—Average for the state, 6.11; greatest, 9.48, at Auburn; least, 3.64, at Butler.

Wind.—Prevailing direction, northwest.—P. H. Mell, Signal Corps, Auburn, director.

ARKANSAS.

Summary.

Temperature.—Monthly mean, 41.6; highest monthly mean, 46.5, at Galveston; lowest monthly mean, 36.8, at Dallas; maximum, 79, at Washington, 17th; minimum, 6, at Eureka Springs, 28th; range for state, 74; greatest local monthly range, 81, at Eureka Springs; least local monthly range, 28, at Dallas.

Precipitation.—Average for the state, 5.78; greatest, 8.48, at Washington; least, 3.09, at Atlas.—Prof. John C. Branner, Little Rock, director; W. U. Simons, Corporal, Signal Corps, assistant.

COLORADO.

Summary.

Temperature.—Monthly mean, 18.1; highest monthly mean, 30.4, at Cañon City; lowest monthly mean, 8.1, at Gunnison; maximum, 70, at Breckenridge, 14th; minimum, —25, at Saguache, 1st; range for state, 95; greatest local monthly range, 49.5, at Breckenridge; least local monthly range, 15.1, at Georgetown.

Precipitation.—Average for the state, 0.29; greatest, 1.24, at Glenwood Springs; least, trace, at Thom.—Prof. F. H. Loud, Colorado Springs, director; T. W. Sherwood, Corporal, Signal Corps, assistant.

ILLINOIS.

The remarkably high temperature of the present winter has continued through January and was even more marked than during December. The

mean temperature, 30.7, was 8.5 above the mean of the previous eleven Januarys, and though largely in excess of the average cannot be said to have been phenomenally so, as it has been exceeded twice in the previous eleven years, in 1878 when it was 31.0, and in 1880 when it was 41.8.

The precipitation was slightly above the average; 0.20 above that of the eleven preceding Januarys, being lightest in northern and heaviest in the southern division. In the northern division it was mainly in the form of snow but in the other two the greater part of it was in rain. From 5 to 10 inches of snow fell in the western division and considerably less in the other divisions, but owing to the high temperature and the dryness of the atmosphere it soon disappeared and only traces remained at the end of the month. A general thunder-storm extended over the northern division on the 16th.

Wind.—Prevailing direction, southwest and northwest.—Col. Charles F. Mills, Springfield, director; James Cassidy, Sergeant, Signal Corps, assistant.

INDIANA.

Temperature.—The temperature during the month was uniformly high and its mean the highest noted since 1880, when the mean temperature for the state was 45.9, surpassing, by far, the mean, 32.5, of January, 1883. The mean temperature of January, 1874, 35.5, 1876, 38.6, and 1878, 34.5, were also much above the mean of the current month. The departure of the mean temperature for January, 1889, from the normal of six years is about +8 and from the normal of eighteen years, or more, about +5. At no time during the month, and, in fact during the winter, so far, has the temperature been reported 0. or below. The highest temperature was noted nearly everywhere on the 16th, and the lowest on the 21st.

Precipitation.—The precipitation for the state was slightly below the normal; it was below in the central and northern portions, more so in the latter, and slightly above the normal in the southern portion; it was badly distributed and the total measurements differ materially.—Prof. H. A. Huston, La Fayette, director; C. F. R. Wappenhans, Sergeant, Signal Corps, assistant.

IOWA.

The month was fine and decidedly warm, westerly winds prevailing. Precipitation was normal, and mainly in the form of rain. The mean temperature was nearly 5 above normal. During the six years just preceding, January has been from 8 to 14 below normal, forming the coldest series on record for the state and the upper Mississippi valley; the mean of the preceding six Januarys is more than 10 below normal, consequently, the current month was nearly 15 above the average of the same month of the preceding six years. January, 1880, was over 10 warmer than the month just passed, and was the warmest January noted for the past fifty years. Since 1860, January has been five times as warm or warmer than in this year, namely, in 1880, 1878, 1876, 1869, and 1868, averaging once in four years. At the Central Station the

thermometer descended but once to zero (on the 21st), while in January, 1888, it ranged considerably below zero on twenty-two days.

Rainfall was nearly normal in amount, but fell mainly on the 15th and early on the 16th as a warm rain. In a belt running over Harrison, Polk, Benton, and Jackson counties, across the state, the rainfall during this storm exceeded 1.00. A moderate amount of snow fell on the 8th and 19th in most parts of Iowa. The total rainfall exceeded 1.00 in the east and was less than 1.00 in the west. It was greatest, exceeding 2.00, in a narrow belt running from Clermont over Hopkinton to Clinton.—*Dr. Gustavus Hinrichs, Iowa City, director.*

KANSAS.

The temperature has been above the normal in the middle and eastern divisions. In the southern counties the excess ranges from 6 to 10, while in the central and northern counties it is from 4 to 9. In the western division there is but one station, Dodge City, with a known normal, and here the temperature is but 0.3 above. The eastern division has been the warmest and the western the coldest.

There has been an excess of precipitation except in the extreme eastern and northeastern counties (Doniphan, Atchison, Jefferson, Leavenworth, Wyandotte, Johnson, Douglass, Shawnee, and Wabaunsee), and this excess increased towards the west. The eastern division received 36.0; the middle, 32.4; and the western 31.6 per cent. of the amount that fell.

In the counties from Barber and Sumner northeastward to Jefferson, inclusive, less than 1.00 fell; the other area, where less than 1.00 fell, covers Sherman and Thomas, the northern halves of Logan and Wallace, and the southern half of Cheyenne; 2.00 fell in Russell, Chautauqua, Montgomery, Labette, Cherokee, Crawford, Bourbon, Neosho, and the southeast half of Wilson.

Summary.

Temperature.—Monthly mean, 27.6; highest monthly mean, 35.3, at Rome; lowest monthly mean, 19.3, at Allison; maximum, 60, at Brookville, Bunker Hill, and Ellis, 7th, 29th, 7th; minimum, —9, at Colby, 18th; range for state, 69; greatest local monthly range, 66, at Concordia; least local monthly range, 40, at Wa Keeney; greatest daily range, 41.9, at Topeka, 21st; least daily range, 8.3, 13th, at Leavenworth, and 19th at Concordia.

Precipitation.—Average for the state, 1.19; greatest, 2.44, at Girard; least, 0.34, at Carneiro.

Wind.—Prevailing direction, northwest, *Prof. J. T. Lovewell, Topeka, director; T. B. Jennings, Sergeant Signal Corps, assistant.*

KENTUCKY.

Summary.

Temperature.—The monthly mean for the state, 37.1, is about 4 in excess of the normal. The mean daily maximum temperature was 46.7, and the mean daily minimum, 30.4. The average monthly range was 39.8. The highest temperature, 65, was recorded at Pellville, 18th, and the lowest, 13, at Ashland, 22d. The average warmest day in the month was the 16th, and the coolest the 29th. With the exception of January, 1876 and 1880, when the mean temperatures were 43.1 and 50.1, respectively, the past month was the warmest January since the opening of the central station in 1870.

Precipitation.—The average for the state, 3.52, shows a deficiency of about 0.75. This deficiency was, however, confined to the southern and western portions of the state. In the eastern and northern counties there was a considerable excess. The greatest precipitation reported was 5.66, at Lexington, and the least, 2.32, at Owenton. The snowfall was, as a rule, very light and unevenly distributed through the state. At no place did it remain upon the ground any considerable length of time.—*Dr. E. A. Grant, Louisville, director; Frank Burke, Sergeant, Signal Corps, assistant.*

LOUISIANA.

With the exception of the rainy spell from the 23d to 26th, the month was comparatively pleasant. The temperatures were not extreme either as to heat or cold, the average temperature for the state being 1 above the normal. The highest temperatures reported were generally a few degrees higher than usual for January, while the lowest temperatures were about an average for the month.

The dates of general rainfall were the 1st, 3d, 8th, 15–16th, 23d–26th, and 31st, the totals for the month varying from three to eight inches. The rains were generally heavier in the southern section, the average for that section being over 2.00 in excess of the average for the northern section. The average for the state was 0.3 above the January normal rainfall for Louisiana as determined from observations of past twenty years. There is but a difference of 0.30 in the normal January rainfall of the northern and southern portions of Louisiana (the southern section having the greater normal), showing that during the past month the northern section received about 1.00 less rain than usual, and the southern section about 1.00 more.

Snow fell in five of the northern parishes, but either melted as it fell or the few flakes were unmeasurable. Ice formation and killing frosts were frequently reported from the northern section, and a light frost occurred as far south as the Gulf on the 30th.

Summary.

Temperature.—Monthly mean, 60.3; highest monthly mean, 55.5, at Maurepas and New Iberia; lowest monthly mean, 45.5, at Grand Cane; maximum, 78, at New Iberia, 12th; minimum, 21, at Grand Cane, 21st, and at Clinton, 28th; range for state, 57; greatest local monthly range, 54, at Lake Providence and Rayville; least local monthly range, 35, at Shell Beach; mean daily range, 19.2.

Precipitation.—Average for the state, 5.63; for the northern section, 4.27; southern section, 6.54; greatest local monthly rainfall, 8.20, at the Sugar Experiment Station; least, 3.00, at the North Louisiana Experiment Station; daily rainfalls exceeding 2.50 in twenty-four consecutive hours, none; greatest daily rainfall reported, 2.40, at Arcadia, 16th.—*R. E. Kerkam, Sergeant, Signal Corps, New Orleans, in charge.*

MICHIGAN.

The mean temperature for January is 5.3 above the normal of fourteen years. The temperature was above the normal in all sections; it was above the normal on twenty-four days, below the normal on six, and normal on one day. The highest mean daily temperature, 43, occurred on the 16th, when it was 22 above the normal, and the lowest, 14, on the 19th, when it was 7 below the normal. The highest mean daily temperature in the past fourteen Januarys, 56, occurred on the 1st, 1876, and the lowest, —8, on the 22d, 1883. The highest mean monthly temperature, 33.7, occurred in 1880, and the lowest, 14.5, in 1881. There have been but three years in which the temperature was higher than in this January, viz., 31.5 in 1876, 26.5 in 1878, and 33.7 in 1880.

The average precipitation for the month of January is 0.04 below the normal of fourteen years; it was above the normal in all sections but the southern, where the deficiency amounts to 0.18. The precipitation was general on the 6th, 9th, 10th, 16th, 20th, 27th, 30th, and 31st.

Summary.

Temperature.—Monthly mean, 26.4; highest monthly mean, 30.6, at Williamston; lowest monthly mean, 19.0, at Lathrop; maximum, 55.0, at Berlin and Petersburg, 16th; minimum, —12.6, at Sault de Ste. Marie, 19th; range for state, 67.6; greatest local monthly range, 58.0, at Adrian, Lathrop, and Washington; least local monthly range, 36.0, at Sand Beach; greatest daily range, 46.0, at Omer, 29th; least daily range, 1.5, 7th, at Kalamazoo.

Precipitation.—Average for the state, 2.09; greatest, 4.00, at West Branch; least, 1.00, at Hayes.

Wind.—Prevailing direction, southwest.—*N. B. Conger, Sergeant, Signal Corps, Lansing, director.*

MINNESOTA.

The principal feature of the month was its extraordinary mildness. In southern and central Minnesota it was the warmest January in 7 to 9 years, and in the northern part of the state the temperature exceeded anything on record for 16 years. The precipitation over the state was nearly normal.

Summary.

Temperature.—The mean for the month, 15.6, is 11 above the January normal. The departures from the normal were greatest in the northern part of the state and least in the south. The highest temperatures were noted generally on the 2d and 16th, and the lowest on the 18th and 21st. The highest temperature recorded in the state during the month was 48 at Saint Vincent, 2d, and the same at Medford, 16th. The minimum was 36 below zero at Saint Vincent, 18th, giving a range for the month of 84.

Precipitation.—From 3.25 to 12.50 of snow are reported in the state during the month. The average fall at all stations is 7.50. The average of rain and melted snow for each station reporting is 1.00, which is nearly normal for the month of January. The precipitation was well distributed as to time, and geographically the fall was slightly in excess in northern Minnesota with a corresponding deficiency in the south. The amount of snow on the ground at the end of the month ranged from 0.50 at Saint Paul, Red Wing, and Medford to an average of about 8 in the upper part of the state.

Wind.—Prevailing direction, northwest.—*Prof. W. W. Payne, Northfield, director; John Healy, Private, Signal Corps, Saint Paul, assistant.*

MISSISSIPPI.

Summary.

Temperature.—The monthly mean for the state, 46, is about 2 above the normal. The highest local monthly mean, 52, at Logtown, and lowest, 41, at Macon. The highest temperature was 70 at Vicksburg and Pearlinton, 16th, and the lowest, 21, at Batesville, 28th. The daily range at stations varied from 10 to 22 until the 28th and 29th, when it was only about 5 in the northern part of the state, and near the freezing point.

Precipitation.—The average, 5.24, is 0.26 less than the probable normal rainfall for January. Rainfall exceeding 1.00 in twenty-four hours was reported from nearly all stations on the 16th, and the catch on that day exceeded 2 at University, Pontotoc, Water Valley, and Macon. Almost continuous rainfall occurred from the 24th to the 27th, the wind being southeast. In the northern part of the state a trace of snow fell on the 18th, and enough to cover the ground on the 28th.

Wind.—Prevailing directions, south and southeast.—*R. B. Fulton, Signal Corps, University, director.*

MISSOURI.

Summary.

Temperature.—The mean temperature for January was 31.8. The highest temperature reported in the state was 69 at Ironton, and the lowest, —2, at Frankford. The average of maximum temperatures was 55.3, and the average of minimum temperatures, 6.1, making an average range of 49.2. The highest temperatures occurred on the 3d, 15th, 16th, 23d, and 30th, and the lowest on the 20th, 21st, 27th, and 28th.

Precipitation.—The average precipitation was 2.27, which was 0.66 above

the January normal. The greatest amount of precipitation reported was 4.61 at Cairo, Ill., and the least was 1.00 at Savannah. In the state as a whole, precipitation occurred on nineteen days. The greatest number of days of precipitation at any one place was thirteen, at Cairo, Ill.—*Prof. Francis E. Nipher, Saint Louis, director; G. A. Weber, Sergeant, Signal Corps, assistant.*

NEBRASKA.

The month has been prevailingly warm and pleasant with almost no severe weather, and with a good amount of precipitation, at least in southeastern Nebraska; the precipitation was mostly in the form of rain.

Summary.

Temperature.—The mean temperature for southeastern Nebraska was 23.5, which is 6 above the normal, and has not been exceeded since 1882. The maximum was 58, which is the highest recorded for January, with the exception of the last two years. The lowest temperature for the month was -16° .

Precipitation.—Two areas of the state have received over an inch of rain, viz., the lower Niobrara basin and the region south of the Platte as far west as Red Willow County. At the extreme west of the state the rainfall was almost nothing.—*Prof. Goodwin D. Swezey, Crete, director; G. A. Loveland, Corporal, Signal Corps, assistant.*

NEVADA.

The first eleven days of the month were characterized by warm, sunshiny weather and a total absence of precipitation; from the 12th to the 18th there was a period of cold and rainy weather, nearly all of the precipitation for the month occurring between those two dates, but more particularly on the 18th, on which date thirteen out of a total of twenty-four stations reported precipitation in amounts ranging from 0.03 at Beowawe, to 0.86 at Tuscarora. The remainder of the month was attended by clear warmer weather, with very little precipitation.

Summary.

Temperature.—Although the monthly mean temperature, 28.7, was slightly below the normal, 31.7, for the past ten years, yet the weather, with but few exceptions, was generally mild and pleasant during the day, and the nights cold, especially so during the first ten and last five days of the month, the highest temperature, 56.6, occurring on the 9th. A cold wave passed over the station on the 18th and 19th, causing a fall in temperature of 40 in about 16 hours, from 33.8, at 2 p. m. of the 18th, to -7° the next morning, this being the lowest reading during the month. The range of temperature was 63.6.

Precipitation.—This was, comparatively speaking, a very dry month, the total amount of rainfall and melted snow, 0.10, indicating a deficiency of 1.68. It is the lowest on record since 1880, and is remarkably small when it is considered that as much as 5.57 of rain and melted snow fell during January, 1886. There were but two rainy days during the month, the 14th and 17th. The total deficiency for the season, from September 1, 1888, to January 31, 1889, is 3.30.

Wind.—Prevailing direction, northeast.—*Prof. Charles W. Friend, Carson City, director; E. H. Thompson, Private, Signal Corps, assistant.*

NEW ENGLAND METEOROLOGICAL SOCIETY.

The chief peculiarity of the month was its unusually high temperature, making it one of the warmest Januaries on record. The average temperature exceeded the normal by about 8, which has been rarely surpassed. January, 1880, was warmer in southern New England, and the temperature of this month in 1843, 1858, and 1870 was nearly the same as the current year. The month is in strong contrast with January, 1888, which was about 7 colder than the average, and at some stations the coldest month on record. The exceptionally high average of the past month was due to the uninterrupted period of warm days which extended from the 1st to the 19th. Maximum readings as high as 60 were noted. On account of the warm weather there was but little frost in the ground, and wild flowers began to bloom in favoring localities.

The snowfall was very light, the month in this respect also contrasting strongly with January, 1888. The precipitation as a whole, however, was equal to the monthly average, or a little greater, at the majority of stations.

Summary.

Temperature.—Monthly mean, 30.7 (100 stations); highest monthly mean, 38.0, at Block Island; lowest monthly mean, 22.1, at West Milan; maximum, 63, at Olneyville, 4th; minimum, -14° , at Stratford, 23d; range for New England, 77; greatest local monthly range, 74, at Stratford; least local monthly range, 37, at Cotuit and Provincetown; greatest daily range, 49, at Stratford, 23d; least daily range, 0, at Walpole, 19th.

Precipitation.—Average for New England, 4.97 (131 stations); greatest, 7.64, at Fall River; least, 1.77, at Stratford.

Wind.—Prevailing direction, northwest (19 stations).—*Prof. William H. Niles, Boston, Mass., president; Prof. Winslow Upton, Providence, R. I., secretary; Park Morrill, Sergeant, Signal Corps, assistant.*

NEW JERSEY.

Summary.

Temperature.—The mean for January, 36.2, is 6.7 above the average determined from past records of forty-nine stations, and 10.8 above the average for the corresponding month of 1888. The warmest days during the month were the 4th, 5th, 8th, 9th, 16th, and 17th, and the coldest, the 2d, 15th, 19th, 20th, 22d, 23d, 24th, and 30th. The lowest temperature recorded in the northern portion of the state was 8; in the central portion, 16; and in the southern portion, 21.

Precipitation.—The average for the state, 5.68, is 2.04 above the average determined from past records of forty-nine stations, and 0.91 above the average for the corresponding month of 1888. Three stations, Freehold, Oceanic, and Plainfield, report a total for the month exceeding 8.00; two stations, Tom's River and South Orange, a total exceeding 7.00; and nine stations a total exceeding 6.00. The snowfall during the month was phenomenally light; the greatest depth reported being 6.00 at Madison on the 20th. This station is the only one reporting snow on the ground at the close of the month (about 1.00).

Wind.—Prevailing directions, northwest and west.—*Prof. George H. Cook, New Brunswick, director; E. W. McGann, Sergeant, Signal Corps, assistant.*

NEW YORK.

Summary.

Temperature.—The highest temperature was 62, at Albany and Ardenia, 17th; the lowest, -12° , at Saranac Lake, 15th. The mean temperature for the state was 28.7; the 17th being the hottest, and the 19th the coldest day. The temperature was above the normal at all stations.

Precipitation.—Average for the state, 4.22. The rainfall was above the normal at all stations except Albany, Cooperstown, Erie (Pa.), North Hammond, and White Plains, where a slight deficiency is reported. The greatest daily rainfall was 1.88, at Setauket, 6th. The average number of days on which 0.01 or more of rain or melted snow fell was 12.

Wind.—Prevailing direction, west.—*Prof. E. A. Fuertes, Ithaca, director; I. W. Brewer, Private, Signal Corps, assistant.*

NORTH CAROLINA.

Summary.

Temperature.—Monthly mean, 48.0; highest monthly mean, 48.0, at Hatteras, New Berne, and Wilmington; lowest monthly mean, 39.0, at Knoxville, Tenn.; highest temperature, 79.0, at New Berne, 14th and 17th; lowest, 14.0, at Lenoir, 30th; range for state, 65.0; mean monthly range, 45.0; highest monthly range, 59.0, at New Berne; lowest monthly range, 30.0, at Hot Springs; mean daily range, 17.0; highest mean daily range, 28.0, at New Berne; lowest mean daily range, 9.0, at Hatteras.

Precipitation.—Average monthly rainfall, 5.56; greatest monthly, 6.85, at Wilmington; least monthly, 3.50, at Lenoir.

Wind.—Prevailing direction, northwest.—*Dr. Herbert B. Battle, Raleigh, director; H. McP. Baldwin, Sergeant, Signal Corps, assistant.*

OHIO.

The chief peculiarity of the month was its unusually high temperature, making it the warmest January on record.

Summary.

Temperature.—The mean temperature, 33.3, exceeded the average for the past seven years by 8.5. The mean of the northern section was 31.4; the middle section, 32.7, and the southern section, 35.8. The means are 8.8, 8.5, and 8.1 above the averages for the sections. The maximum temperature, 61, at Portsmouth, 23d, and the minimum, 8, at Wauseon, 29th. The mean daily range of temperature was 15.2. The greatest daily range was 49, at Westerville, 23d, and the least, 1, at Fostoria, 5th.

Precipitation.—Precipitation was general and heavy in all sections on the 5th, 6th, 9th, 16th, 20th, 27th, and 28th. Light local rains or snows occurred in all sections on the 8th, 21st, 24th, and 31st; in the northern section on the 7th, 11th, and 17th; the middle and southern sections on the 14th and 26th. The mean rainfall in the northern section was 2.73, and in the middle section, 3.45. These means are 0.18 and 0.10 above the averages for the sections. The mean in the middle section, 3.22, was 0.26 below the usual amount. The mean for the state, 3.13, agrees with the seven-year average for January. The greatest monthly rainfall was 4.80, at North Lewisburgh, and the least, 0.64, at Wapakoneta.—*Prof. B. F. Thomas, Columbus, director; Lieut. Charles E. Kilbourne, secretary; C. M. Strong, Private, Signal Corps, assistant.*

PENNSYLVANIA.

Summary.

Temperature.—The mean temperature for January, 1889, 31.9, is about 5 above the average, and 9.8 above that of January, 1888. The mean of the daily maximum temperatures was 31.6, and of the daily minimum temperatures, 27.2. The warmest period of the month was the 17th, and the coldest from the 19th to 23d, inclusive. The highest temperatures reported were Westtown, 68.0; Carlisle, 65.0; Reading, 64.5; McConnellsburgh, 64.0; Lancaster, 64.0, and New Bloomfield, 64.0. The lowest were Charlesville, -5° ; Emporium, -3° ; Honesdale, -3° ; Smethport, -2.5° ; Hollidaysburgh, -2° ; New Castle, -2° ; Coudersport and Wellsborough, -2° . Stations with the highest monthly mean were Philadelphia, 37.3; Uniontown, 36.5; Pittsburgh, 35.2; Catawissa, 35; Pottstown, 35, and Indiana, 34.9. Those with the lowest were Eagles' Mere, 26.6; Honesdale, 27.8; Philipsburgh, 28.3; Greenville, 28.7; Coudersport, 28.6, and Clarion, 29.1.

Precipitation.—The average rainfall, including melted snow, was 3.54, which is slightly above the normal. The fall was very evenly distributed, both during the month and over the state. Light snow squalls were frequent. The heaviest snowfall occurred on the 20th. The greatest totals for the entire month were, Meadville, 21; Eagles' Mere, 19; Coudersport, 18; Somerset, 13; Wellsborough, 12, and Rimersburgh, 12. Very little snow remained on the ground at the end of the month.

Wind.—Prevailing direction, west.—*Under direction of the Franklin Institute, Philadelphia; T. F. Townsend, Sergeant, Signal Corps, assistant, in charge.*

SOUTH CAROLINA.

Summary.

Temperature.—The monthly mean, 44.9, is 1.3 below the mean of January, 1888; highest monthly mean, 52.3, at Timmons ville; lowest monthly mean, 41, at Camden; maximum, 78, at Cedar Springs, 17th; minimum, 15, at Spartanburg, 5th; monthly range for state, 63.

Precipitation.—Average for the state, 5.81; greatest monthly, 8.79, at Aiken; least monthly, 3.35, at Spartanburg; greatest daily, 2.14, at Brewers Mines, 4th; average number of rainy days, 9.6.

Wind.—Prevailing direction, northeast.—*Hon. A. P. Butler, Columbia, director; H. C. Seymour, Private, Signal Corps, assistant.*

TENNESSEE.

The month presented some rather abnormal features, the principal of which were the high average temperature and the low percentage of cloudiness.

Summary.

Temperature.—The mean temperature, 40.3, is the highest January mean during the period of six years from 1884, and more than 6 above the mean of the six years. The highest local mean was 43.7, at Parksville, and the lowest, 38.2, at Lewisburgh. The maximum temperature observed was 82 on the 13th, at Waynesborough, and was by 8 the highest January maximum during the past six years. The minimum observed was 13 on the 30th at Fostoria, and was by 11 the highest January minimum in the past six years, the next highest being 2 last year. The highest temperature was generally recorded on the 14th and 16th, and the lowest on the 28th, 29th, and 30th; on the first named date in the western division and the last in the eastern division, showing the movement of the cold wave from west to east. The ranges of temperature were about the normal, only, the greatest daily range, 48, was the greatest recorded in January during the six years.

Precipitation.—The mean precipitation for the month, 4.31, is more than 1.00 less than the January mean for the past six years. Some of this, especially during the latter days of the month, was in snow. The amount was pretty well distributed over the state, the western division receiving perhaps a slight excess. The great proportion of the amount fell during the latter half of the month, the last week showing an almost continuous record of rain or snow. The day of the greatest rainfall was the 16th. The greatest monthly rainfall at any station was 5.69 at Lawrenceburgh, and the least, 2.90, at Clarksville. The greatest local daily rainfall was 2.58 on the 16th at Trenton. There were eight days on which no measurable rainfall was reported. Snow reported on nine days, but mostly light and melting as it fell. In a few instances the fall was sufficient to measure, Clarksville showing the greatest depth, 3.00.

Wind.—Prevailing direction, northwest.—*J. D. Plunket, M. D., Nashville, director; H. C. Bate, Signal Corps, assistant.*

TEXAS.

The month of January was remarkably wet. There was scarcely a day that rain was not reported at some of the stations in the state.

Summary.

Temperature.—The average for January was about normal. The mean for the state, 47.5, is 4.2 lower than the average of last month. The mean maximum temperature was 57.3, and the mean minimum, 38.6. The highest temperature reported from any station was 81.6, on the 15th, at Gallinas, and the lowest, 11, on the 27th, at Silver Falls, the absolute range for the state being 70.6. The greatest monthly range of temperature at any station was 60.1, at Gallinas, and the lowest monthly range, 36, at Fort Worth. The average range for the state was 46.9. There were a few days that the mean daily temperature was below 38, and only two days that it was above 60.

Precipitation.—The average rainfall for January was 6.31, which is considerably in excess of the normal. The greatest precipitation in any consecutive twenty-four hours at any station occurred on the 15th, at Ingersol, 3.29. The greatest monthly precipitation, 13.65, was reported at Tyler; the least, 0.76, at El Paso.

Wind.—The prevailing winds were east and southeast along the coast; in the interior, east and northerly.—*S. O. Young, M. D., Galveston, director; Allen Buell, Sergeant, Signal Corps, assistant.*

ERRATA.

Errors, other than those noted in error sheet for excessive precipitation, published in REVIEW for December, 1888, have been detected as follows: October, 1887, page 281.—Precipitation at Bird's Nest, Va., should be, average for October, 3.26; total for October, 1887, 6.35; deviation from average, +3.09. December, 1887, page 330.—Excessive daily rainfall at Clarksville, Tex., 8.50, should be omitted; page 326.—Extreme monthly precipitation at Dale Enterprise, Va., should be 6.81 in 1881, instead of 12.63 in 1885. February, 1888, page 56.—Minimum temperature at Utica, N. Y., should be —11, instead of —21. March, 1888, page 60.—In table, barometer range at New Haven should be .31, instead of .51; page 69.—Excessive precipitation data for Savannah, Florence Station, and Austin, Tenn., under heading 10 inches, or more, should be transposed to column of 2.50 inches, or more, etc. April, 1888, page 99, Alabama State Weather Service, precipitation, should be,

greatest, 9.96, at Pineapple; least, 4.70, at Eufaula, instead of as printed. July, 1888, page 159 and August, 1888, page 186.—The expression, tri-daily weather maps, should be twice daily etc. September, 1888, page 214.—In barometer ranges, Sanford, Fla., should be Titusville, Fla.; page 220.—Statesburgh, Smith Co., should be Sumter Co.; page 231.—Reily, McHenry Co., should be Riley; page 244.—Year 1849, first mentioned, should be 1839. November, 1888, page 279.—In list of places having 3 inches or more of snowfall, Utica, N. Y., 4.50, should be added; page 290.—In table, precipitation at Ash Canyon, Ariz., 1.03, should be omitted; page 290.—In table, rainfall at Greeley, Colo., 4.80, should be, 0.48.

Meteorological record of voluntary observers and Army post surgeons, January, 1889.

The observations at stations marked thus (*) are from readings of Signal Service instruments.

Stations.	Temperature. (Fahrenheit.)			Precip'n.		Stations.	Temperature. (Fahrenheit.)			Precip'n.
	Max.	Min.	Mean.				Max.	Min.	Mean.	
<i>Alabama.</i>	0	0	0	<i>Ins.</i>		<i>California—Cont'd.</i>	0	0	0	<i>Ins.</i>
Bermuda*†.....	66	24	47.0	7.80		Auburn†.....	64	27	44.6	0.33
Butler*.....	69	24	44.9	3.64		Bakersfield†.....	62	30	46.0	0.57
Citronella*.....	73	27	51.9	7.13		Benicia Barracks.....	71	31	45.6	0.94
Florence*.....	58	19	40.0	3.41		Banning*.....	76	30	48.8	0.98
Gadsden*.....	62	19	42.5	6.36		Barstow†.....	62	19	42.5	0.14
Greensborough.....	66	26	47.1	5.40		Bordent.....	61	30	45.1	0.15
Livingston*.....	67	26	46.4	4.47		Boulder Creek†.....	65	25	44.7	1.24
Mt. Vernon B'ks.....	71	24	50.5	7.09		Brentwood†.....	69	29	45.3	0.48
Motes*.....	66	17	44.6	6.82		Byront.....	64	30	46.2	0.00†
New Market*.....	61	18	41.2	5.78		Cactus†.....	64	30	46.2	0.71
Selma.....	62	26	48.2	7.45		Caliente†.....	62	42	61.3	.....
Talladega.....	84	21	47.0	8.24		Calistoga†.....	66	28	47.8	.....
Troy*.....	84	22	50.1	6.11		Castroville†.....	67	24	46.0	0.96
Tuscaloosa.....	66	21	50.4	5.33		Castroville†.....	63	32	48.5	0.10
Tuscumbia.....	63	21	42.8	8.39		Colegrove.....	60	11	34.0	.....
Union Springs.....	71	28	47.0	5.07		Coles†.....	64	28	43.2	0.50
Uniontown.....	66	26	49.3	1.93		Corning†.....	54	30	44.8	0.27
<i>Arizona.</i>				1.80		Davisville†.....	64	32	46.1	0.20
Antelope Valley.....				0.93		Dolano†.....	68	29	46.4	0.63
Ash Canyon.....				0.93		Delta†.....	68	27	44.3	0.15
Benson†.....	65	30	45.3	2.16		Downey†.....	69	34	51.0	0.60
Casa Grande†.....	71	35	51.0	1.84		Dunsmuir†.....	70	27	41.0	0.30
Cedar Springs.....				1.26		Dunnigan†.....	66	27	43.4	0.27
Eagle Pass†.....	58	19	36.0	1.26		El Dorado†.....	65	28	43.8	0.31
Florence.....	67	23	45.1	1.90		El Miraflores†.....	70	31	49.0	0.32
Fort Apache.....	57†	6	31.7	2.09		El Verano†.....	70	28	47.8	1.16
Fort Huachuca.....	54	23	38.3	2.66		Emigrant Gap†.....	56	20	35.7	.....
Fort Lowell.....	72	25	40.9	4.15		Esperanza†.....	54	30	40.2	0.35
Fort McDowell.....	72	25	47.3	2.90		Farmington†.....	53	29	44.7	0.20
Fort Mojave.....	68	30	46.6	2.15		Felton†.....	71	24	47.5	1.16
Fort Verde.....	62	15	38.5	2.15		Florence†.....	84	34	55.0	0.37
Globe.....	62	20†	41.2	0.30		Folsom†.....	61	27	44.7	0.32
Holbrook†.....	53	7	31.7	2.37		Fort Bidwell.....	65	22	35.8	2.81
Mount Huachuca†.....	56	19	32.2	1.59		Fort Mason.....	61	39	46.6	1.11
Pantanot.....	58	27	40.2	1.56		Fruto†.....	61	32	47.3	0.82
Peoria.....	65	30	47.0	1.20		Georgetown*.....	62	25	43.2	0.66
San Simon†.....	60	30	44.5	1.74		Gilroy†.....	65	28	46.0	0.46
Teviston.....				0.70†		Girard†.....	67	26	41.8	0.05
Tucson (1).....	77	30	52.6†	1.74		Goshute†.....	62	29	44.6	0.30
Tucson (2)†.....	70	38	57.4	1.73		Glen Ellent†.....	70	27	46.3	1.56
Whipple Barracks.....	54	10	28.0	1.15		Hanford†.....	64	30	43.0	0.31
Wilcox†.....	65	25	45.8	2.04		Hollister†.....	77	29	47.6	0.88
Williams.....	50	0	24.6	7.77		Hornbrook†.....	55	2	33.2	.....
Willow Springs.....				3.09		Hydesville*.....	66	27	44.4	4.55
<i>Arkansas.</i>				5.04		Ione†.....	72	24	46.6	0.12
Alexander.....	61	18	39.6	8.12		Kings City†.....	70	25	46.0	0.92
Altus.....	60	13	39.7	5.84		Keene†.....	66	25	41.6	0.36
Arkansas City*.....				7.00		Knight's Landing†.....	57	32	43.9	.....
Camden*.....				4.40		Lathrop†.....	68	30	44.1	0.32
Conway.....	64	21	41.3	4.11		Laurel†.....	65	30	48.1	0.62
Dallas*.....	50	27	36.8	7.00		Lemoore†.....	59	30	41.7	0.27
Dayton*.....	63	15	42.7	3.85		Livingston†.....	62	32	52.6	0.27
El Dorado*.....	66	19	41.6	6.26		Long Beach†.....	76	31	46.4	.....
Eureka Springs.....	66	5	39.2	4.46		Los Angeles†.....	68	28	49.9	0.22
Forrest City.....	66	19	45.6	4.46		Mammoth Tank†.....	75	30	51.2	0.62
Fulton*.....				6.75		Martinez†.....	69	29	45.8	1.05
Galveston*.....	68	21	46.5	5.66		Marysville†.....	75	34	53.1	.....
Heber.....	65	15	39.3	3.80		Menlo Park†.....	64	32	47.5	0.65
Helena (1).....				4.40		Modesto.....	68	32	45.0	0.45
Helena (2).....	64	21	42.3	3.78		Montague†.....	54	0	33.7	.....
Hot Springs.....	15	11	38.1	7.30		Monterey†.....	70	29	49.8	0.81
Lead Hill.....	65	11	38.1	7.50		Napa†.....	59	28	44.9	0.87
Little Rock B'ks.....	62	20	43.4	6.15		Needles.....	67	32	49.8	3.36
Lonoke.....	67	24	46.2	5.76		Newark†.....	64	32	48.8	0.42
Newport*.....				4.70		Newman†.....	65	30	48.3	0.51
Ozone.....	59	9	38.7	1.42		Nilest.....	70	33	50.4	0.40
Portia*.....	68	18	40.8	4.11		Norwalk†.....	70	28	48.2	0.22
Stuttgart*.....	65	22	42.7	8.48		Oakland (1).....	62	34	47.7	0.90
Texaskana.....	67	20	44.8			Oakland (2)†.....	64	34	47.7	1.15
Washington*.....	79	21	44.2			Oroville.....	71	32	47.0	0.16
<i>British Columbia.</i>				5.99		Pajarof.....	71	30	49.0	0.56
New Westminster.....	47	24	35.9	0.50		Paso Robles†.....	67	22	41.6	0.78
<i>California.</i>				0.54		Placerville†.....	59	26	41.3	0.55
Alcadero†.....	60	30	43.7	0.55		Pomonat.....	80	35	57.3	0.51
Alcatraz Island.....	61	42	49.3	0.14		Presidio of San F.....	66	36	50.2	1.18
Almaden.....	68	31	50.5	1.68		Puente†.....	70	28	49.5	0.04
Anaheim†.....	74	34	57.8	0.95		Red Bluff†.....	80	31	46.9	0.23
Angel Island.....	73	39	55.4	0.50		Redding†.....	65	30	45.5	.....
Antioch†.....	65	30	43.6	0.36		Rocklin†.....	62	29	43.6	0.07
Apotos†.....	65	30	48.6			Rumsey†.....	65	30	47.4	0.95
Atholnet.....	69	28	45.9							